ArcMap 9.2 Utility Tools

Introduction

The Service Center Agencies often need simple tools to calculate area, measure lengths and to digitize and save coordinates. Some utility tools are included with the Custom Service Toolkit, but they are not available outside the toolkit environment. The Geospatial Data Management Team surveyed the NRCS State GIS Coordinators for miscellaneous tools they use or would like to have available to state and county employees.

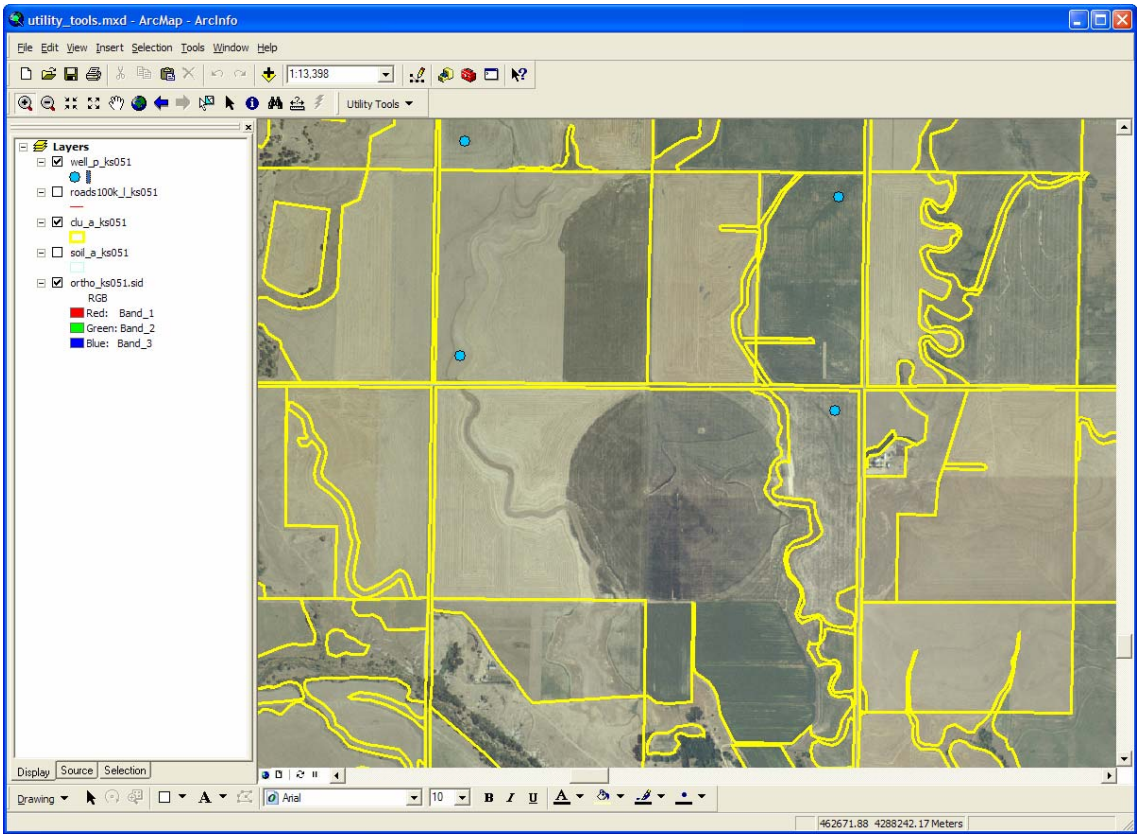
ArcMap 9.2 Utility Tools

The National Cartography & Geospatial Center has modified existing tools developed by the NRCS State Office in Michigan to meet field office needs for utility tools. The tools have been migrated from Visual Basic to the .NET environment. Some enhancements were made during the migration. The tools work against ESRI shapefile and geodatabase features or drawn graphic features. Four tools are provided by the Utility Toolbar – Area, Length, Coordinates, Layer Cutter and Report. Each will be covered in these instructions.

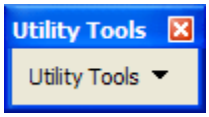
Step 1: Accessing the Tools

- Start ArcMap and open the *C:/Student/utility_tools_data/utility_tools.mxd* project or add the following layers from the *GEODATA* directory from the *Introduction to ArcGIS 1 for USDA SCA* course.

well_p_ks051.shp	*roads100k_l_ks051.shp*
clu_a_ks051.shp	*soil_a_ks051.shp*
ortho_ks_051.sid	



- Click on *View>Toolbars>Utility Tools* to add the toolbar.



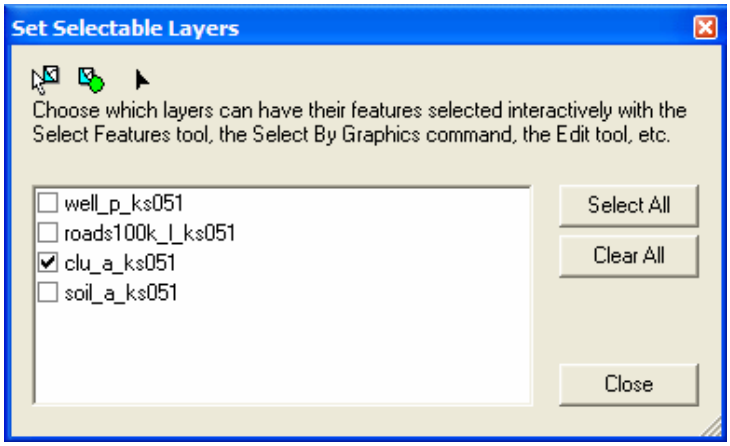
- Dock the toolbar at a convenient location.

Using the Area Tool

The Area Tool can be used with ESRI shape file and geodatabase features or drawn graphic features. Features can be selected before opening the tool or incrementally while using the tool. Drawn features can be created before or after opening the Area Tool. Selected areas can be any combination of drawn graphics or ESRI features. Multiple features may be selected (using Shift + Select features) to provide a cumulative area calculation.

Step 1: Set the Selectable Layer

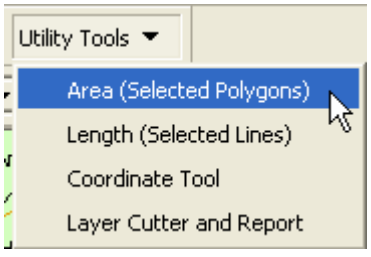
- ❑ On the Main Menu click *Selection>Set Selectable Layers* and select *clu_a_ks051*.



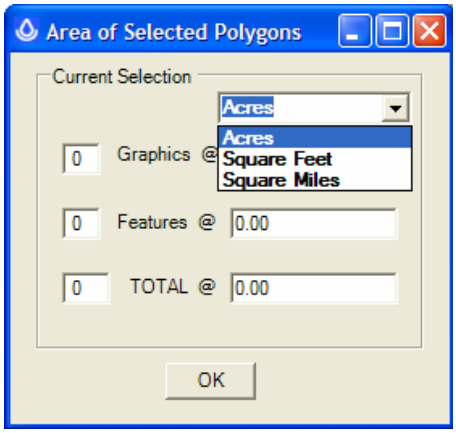
- ❑ Click *Close* after making the selection.

Step 2: Select the Area Tool

- ❑ Click on *Area (Selected Polygons)* from the Utility Tools drop-down menu.

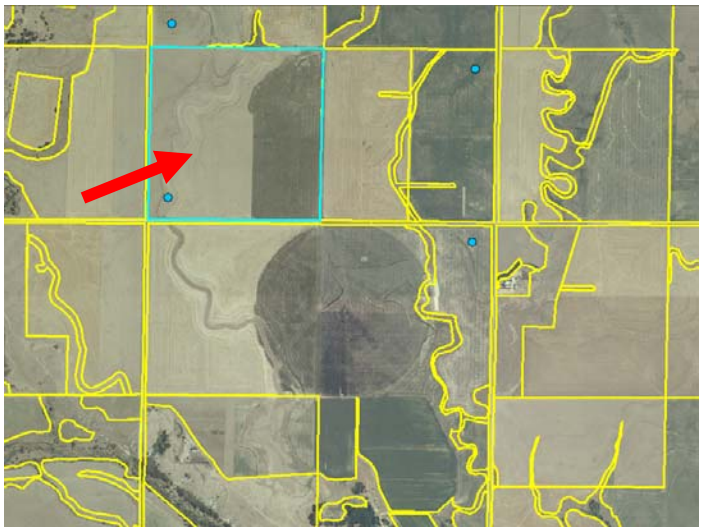


The *Area of Selected Polygon* window will open. Area can be shown in acres, square feet, or square miles. Selected areas can be any combination of drawn graphics or ESRI features.

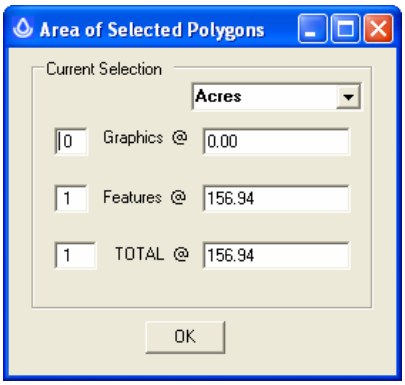


Step 3: Derive Area of Polygon

- ❑ Click the **Select Features** button and select a polygon of interest.

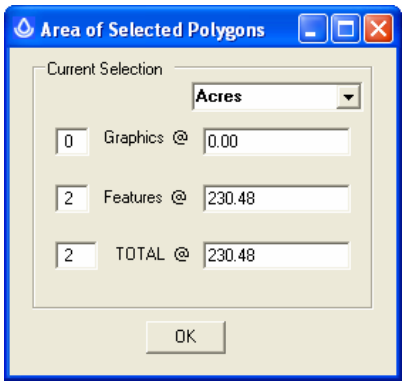


- ❑ The feature will be selected and the area acres provided as shown.

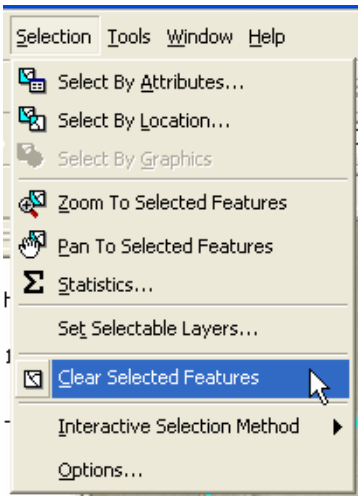


- To obtain cumulative area calculation, Click on the **Select Features** button, hold down the <Shift> key and click the features shown.

The Current Selection Area of Selected Polygons window will be updated.



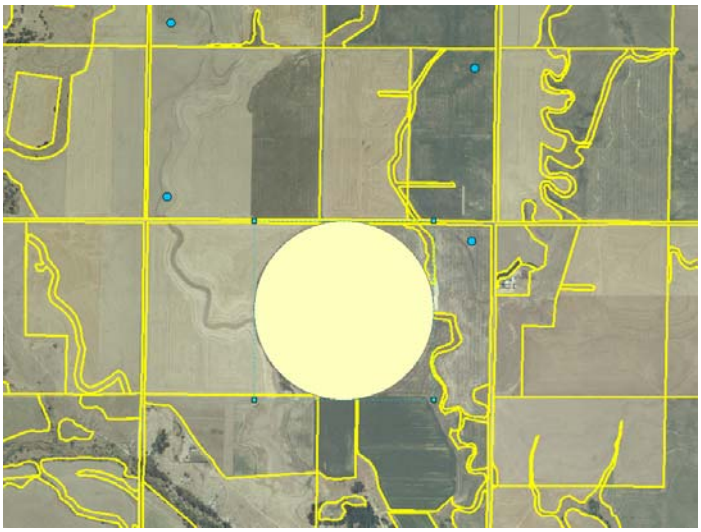
- The Current Selection on the Area of Selected Polygons window may be cleared by clicking on *Selection>Clear Selected Features* on the Main Menu.



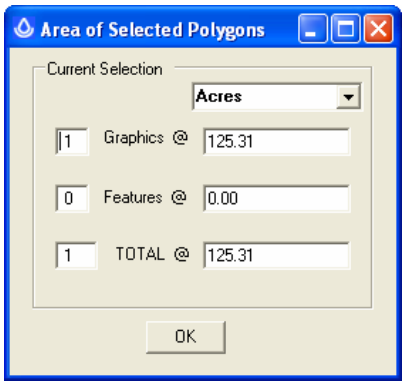
- To exit the Area of Selected Polygons tool, click *OK*.

Step 4: Derive Area of Drawn Feature

- Select *New Circle* on the Draw Toolbar and draw a circle around the center pivot irrigation system. Start from the center, hold down the left button on the mouse and drag toward the outer edge of the circle, and release the button.

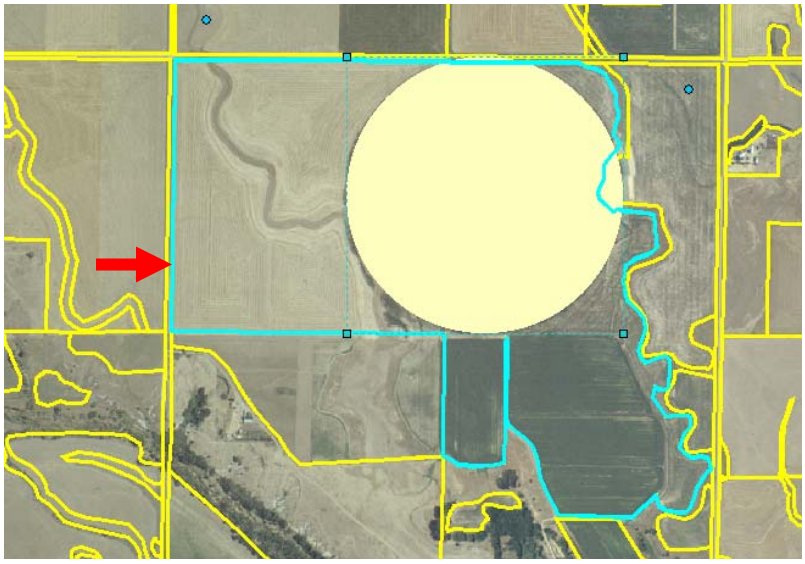


- To open the Area of Selected Polygons window again, click on *Area (Selected Polygons)* from the Utility Tools drop-down menu. The area derived in this example is 125.31 acres.

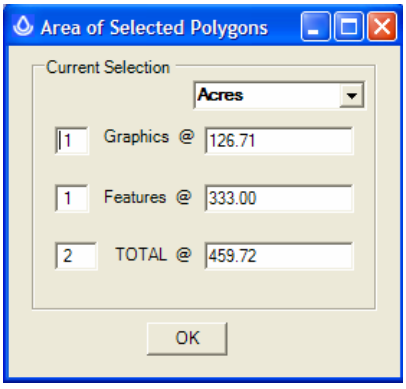


- Polygon features from the CLU layer can be added to the cumulative area.

  Click on the **Select Features** button, and click on one polygon from CLU layer to add its area to the selection



The Current Selection, as in this example, will be shown.



- ❑ Click *OK* to exit the tool.

- ❑ Clear your current selection by selecting *Selection>Clear Selected Features* from the Main Menu.

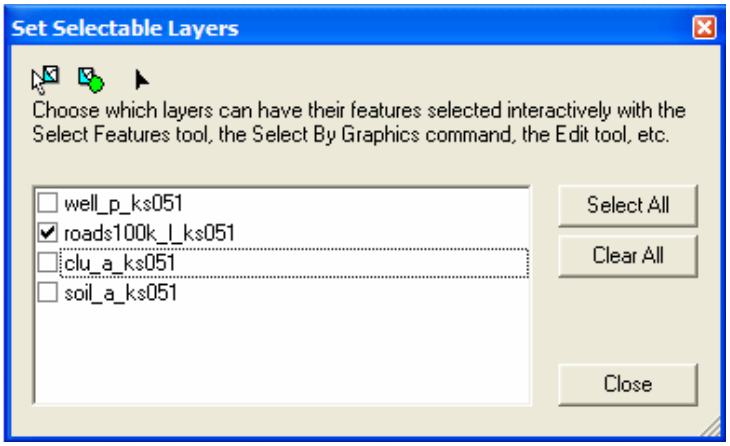
- ❑ Select and delete the graphic feature.

Using the Length Tool

The Length Tool is used to derive the length of any line ESRI line feature or features created by using the draw tools. Length can be shown in feet, meters, or statue miles. Selected areas can be any combination of drawn graphics or ESRI features.

Step 1: Set the Selectable Layer

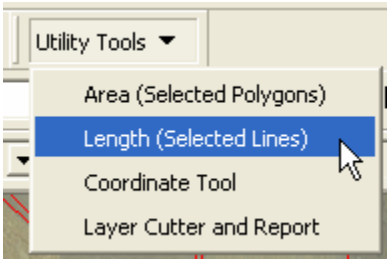
- ❑ Click *Selection>Set Selectable Layers* and select *roads100k_l_ks051*.



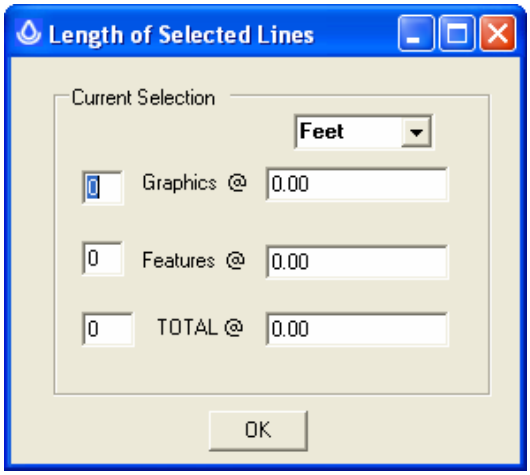
- ❑ Click *Close* after making the selection.

Step 2: Select the Length Tool

- ❑ Click on *Length (Selected Lines)* from the Utility Tools drop-down menu.



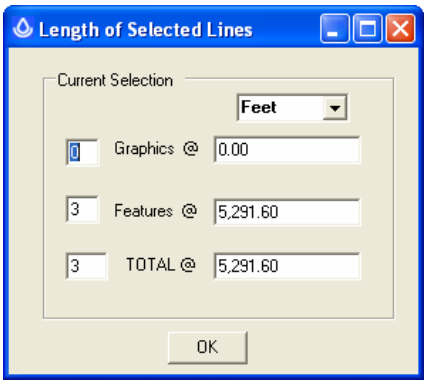
The Length of Selected Lines window will open. Select Feet, Meter, or Mile.



Step 3: Derive Length of ESRI Line Feature

- ❑ In the Table of Contents turn on the *roads_100K_l_ks051* data layer.

- ❑ Click on the Select Feature tool  , move the cursor along the road to the north of the center pivot irrigation system and use the <Shift> key and click on the three segments that comprise the road. In this example the road is 5,291.60 feet in length.

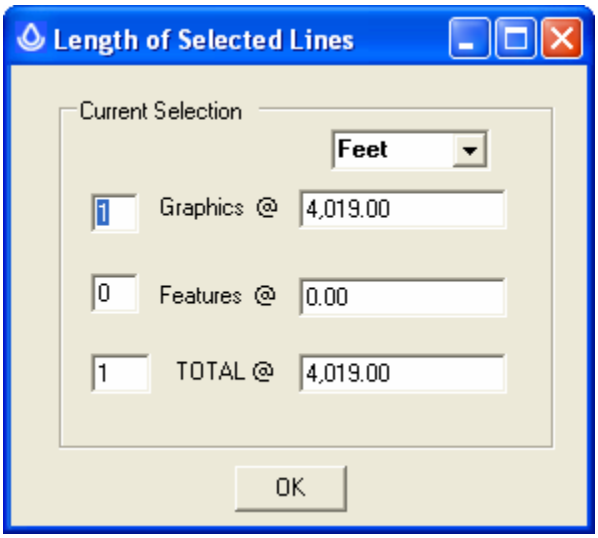


- ❑ From the Main Menu click *Selection>Clear Selected Features* and click *OK* to exit the length tool.

Step 4: Derive Length of Drawn Feature

- ❑ Select *New Line* or *New Curve* from the Draw Toolbar and draw linear feature in the middle of the drainage ditch to the left of the center pivot irrigation system.

- ❑ Open the Length Tool, the Length of Selected Lines window will open and the length of the drawn line will be shown. In this example the drainage ditch is 4,019.00 feet in length. Cumulative lengths can include both features and drawn features.



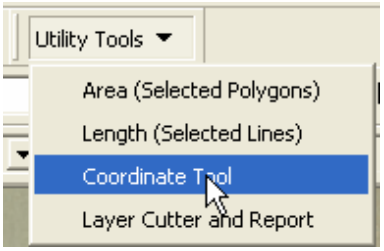
- ❑ Click *OK* to close the length tool.

- ❑ Delete the graphic feature.

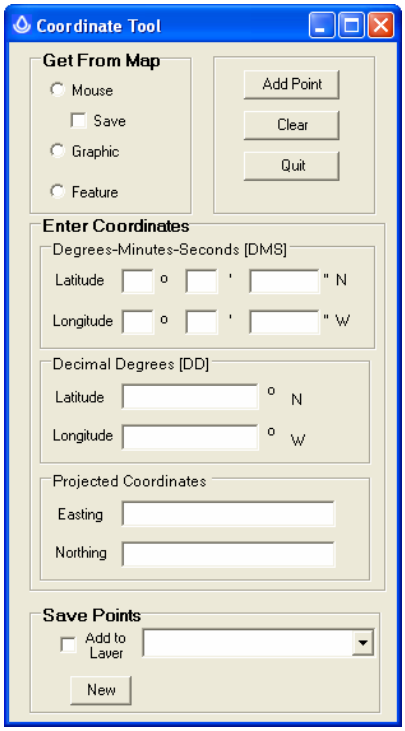
Using the Coordinate Tool

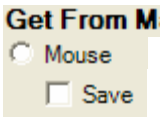
The Coordinate Tool is used to derive coordinates in degrees-minutes-seconds, decimal degrees and UTM projected coordinates. Points can be saved to a shapefile created by the Coordinate Tool or any point shapefile. Coordinate information is only saved to shapefiles created by the Coordinate Tool.

- ❑ Start the Coordinate tool.

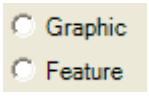


At this point you have several options to obtain coordinates.

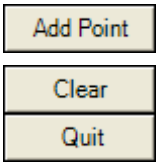




Drag the mouse around the display to view coordinates.
Left click the mouse in the display. Places the coordinates with a crosshair graphic.



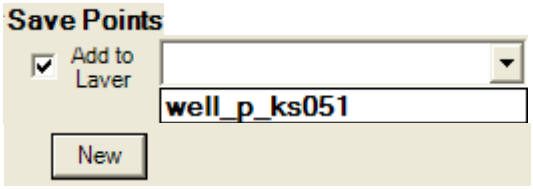
Click on an existing feature or graphics to get coordinates.



Click Clear Coordinates. Type in desired coordinates and click Add Point. Adds point as a graphic to the display area.

Clear coordinates.

Exits the Coordinate tool.

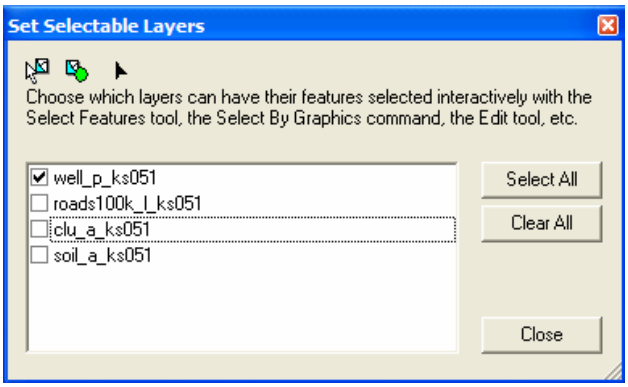


Add coordinates to an existing map layer.

Create new shapefile and add coordinates.

Step 1: Set the Selectable Layer

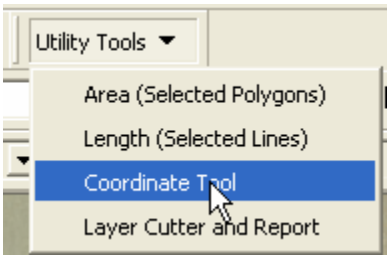
- From the Main Menu click *Selection>Set Selectable Layers* and select *well_p_ks051*.



- Click *Close* after making the selection.

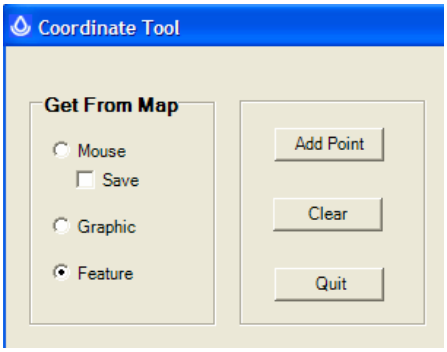
Step 2: Select the Coordinate Tool

- Click on *Coordinate Tool* from the Utility Tools drop-down menu.

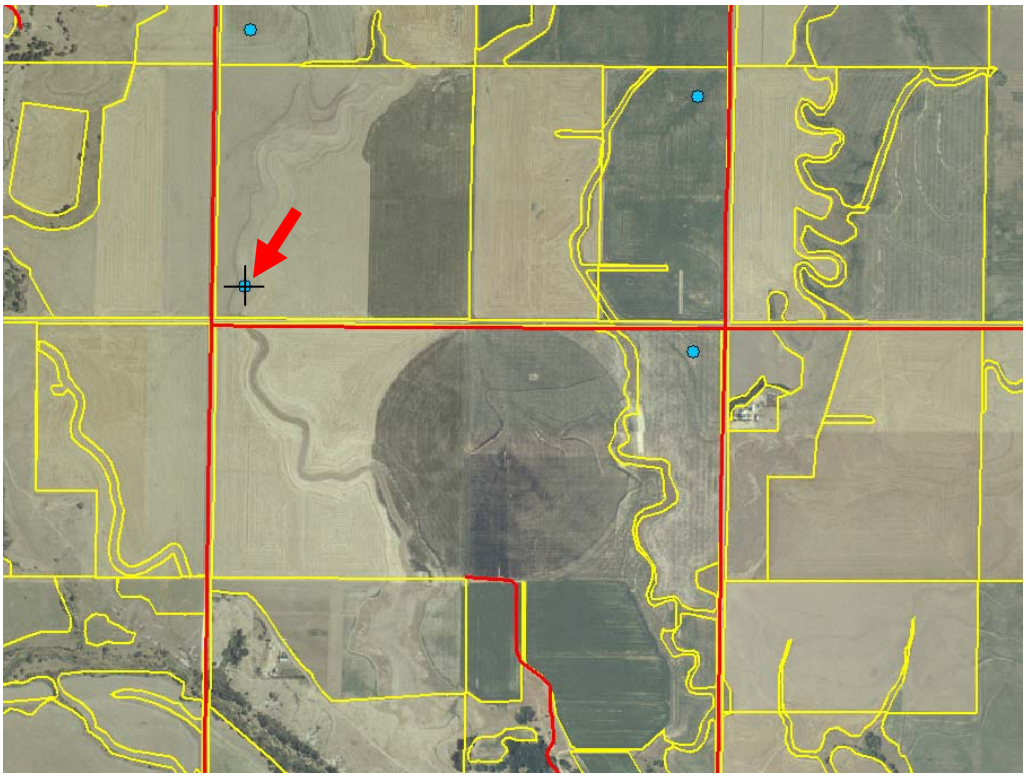


Step 3: Derive Coordinates for Point Feature

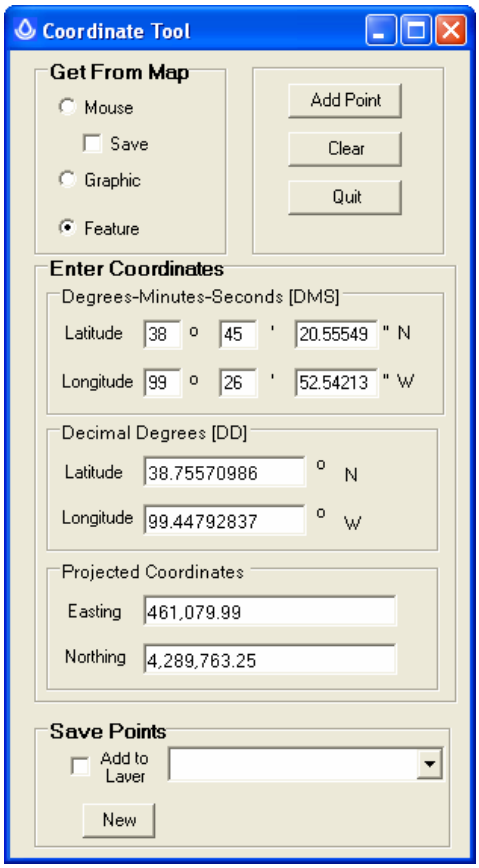
- ❑ Check the *Feature* box once the coordinate tool window is open.



- ❑ Move the cursor to one of the wells to the north of the center pivot irrigation system. The cursor will change from an arrow to a crosshair when you are over the target identified by the red arrow.



- Click the left mouse button to obtain the coordinates as shown on Coordinate Tool window.

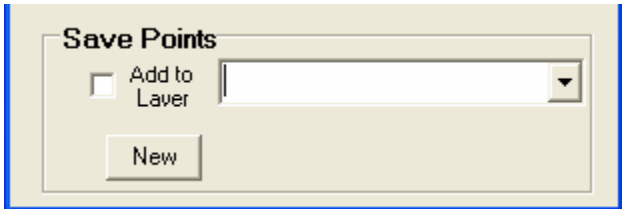


Step 4: Saving Coordinates to Shapefile

Coordinates derived by the tool can be saved to a shapefile (either new or existing one) created by the coordinate tool.

Note: Only points are saved to shapefiles not created by the Coordinate Tool because the attributes are not compatible with those in shapefiles created by the Coordinate Tool.

- If a new point shapefile needs to be created: Click the *New* button.

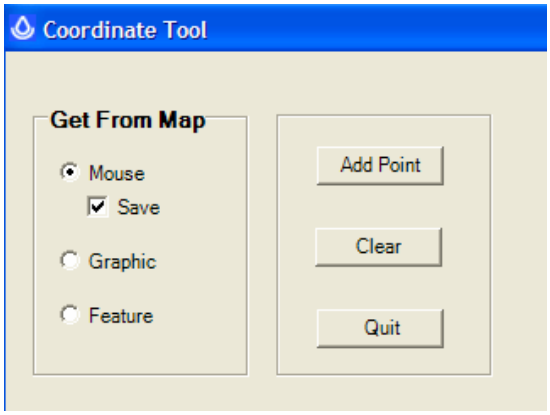


Navigate to directory and name shapefile. The shapefile will automatically be added to the table of contents.

- Check the *Add to Layer* box and select the shapefile you just created or an existing shapefile already in the table of contents.

- Click *Selection>Set Selectable Layers* and select the shapefile you just selected for saving the coordinate points.

- Coordinates can be added from Mouse, Graphic or Feature locations. Select *Mouse* and check *Save* for incrementally adding coordinates to the shapefile.



- Click in the middle of the center pivot irrigation system to record its coordinates. Note the symbolized point on the right side image.

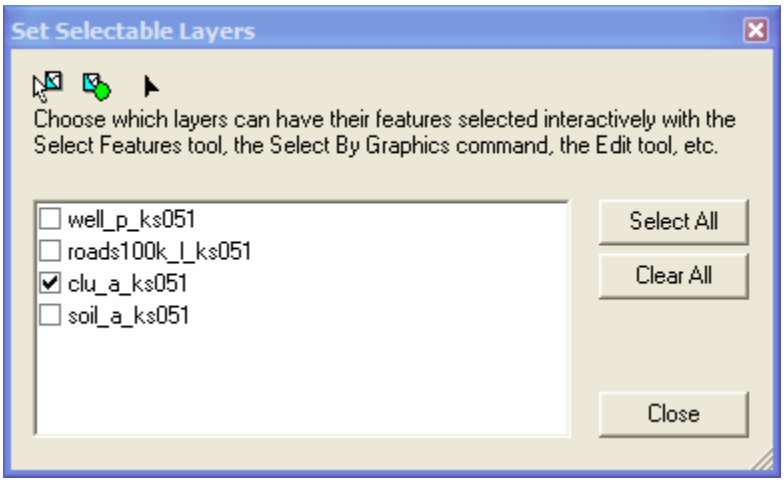
- Click *Quit* to exit the coordinate tool.

Using the Layer Cutter and Report Tool

The *Layer Cutter and Report Tool* is used to extract or subset portions of an existing vector layer and to generate summary reports. Drawn polygons or ESRI polygon features can be used to extract portions of a second layer. Area and other calculations can be generated for a selected attribute, such as soil MUSYM.

Step 1: Set the Selectable Layer

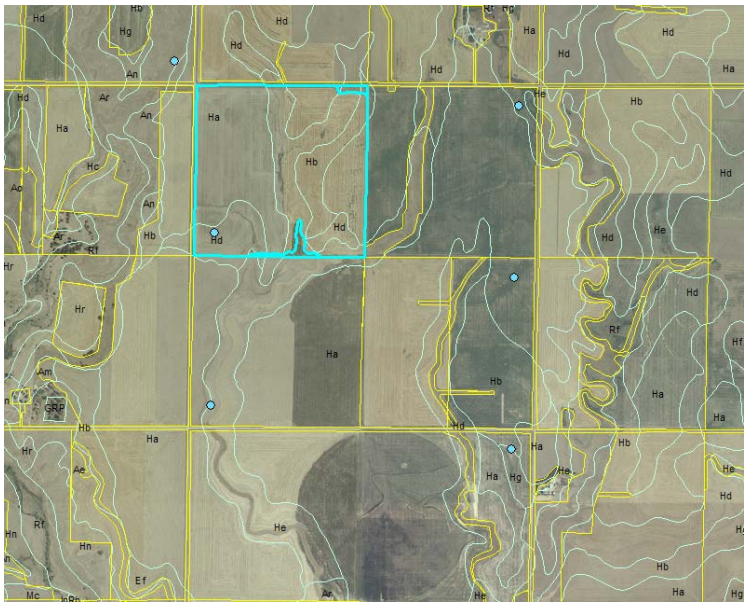
- ❑ Click *Selection>Set Selectable Layers* and select *clu_a_ks051* since a selected clu feature will be used to cut the *soil_a_ks051* layer.



- ❑ Click *Close* after making the selection.

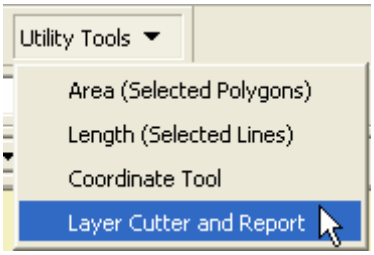
- ❑ In the Table of Contents turn on the *soil_a_ks051* data layer.

- ❑ Use the Select Features tool  to select a CLU polygons, as shown, to use for cutting the soils layer.

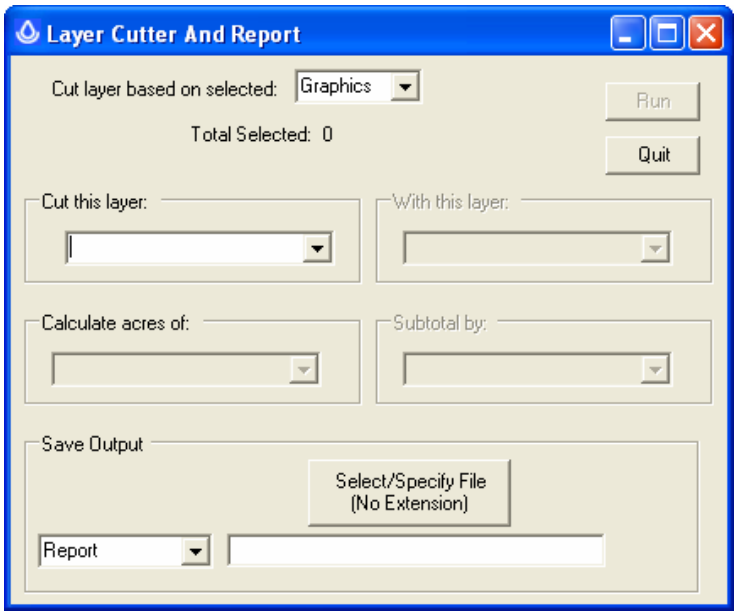


Step 2: Select the Layer Cutter and Report Tool

- ❑ Click on *Layer Cutter and Report* from the Utility Tools drop-down menu.



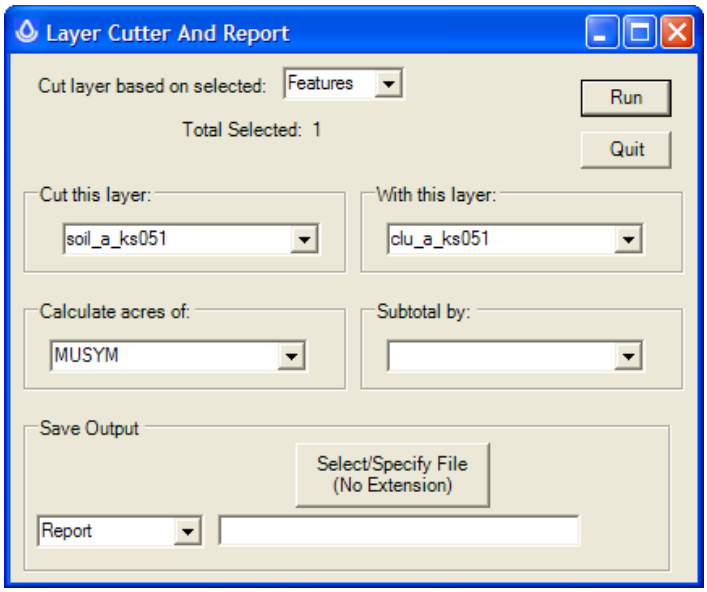
The *Layer Cutter and Report* window will appear.



Step 3: Using a Feature to Create a Report

- ❑ Selected *Features* as the "cut layer based on selected".

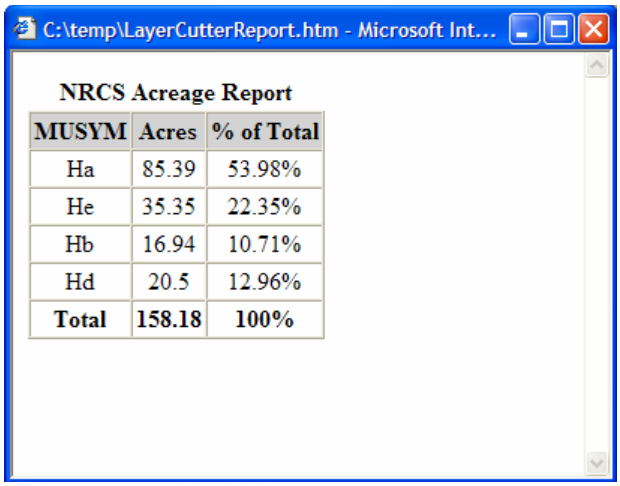
- ❑ Cut the *soil_a_ks051* data layer with the *clu_a_ks051* layer. Calculate acres of *MUSYM* from the *soil_a_ks051* data layer.



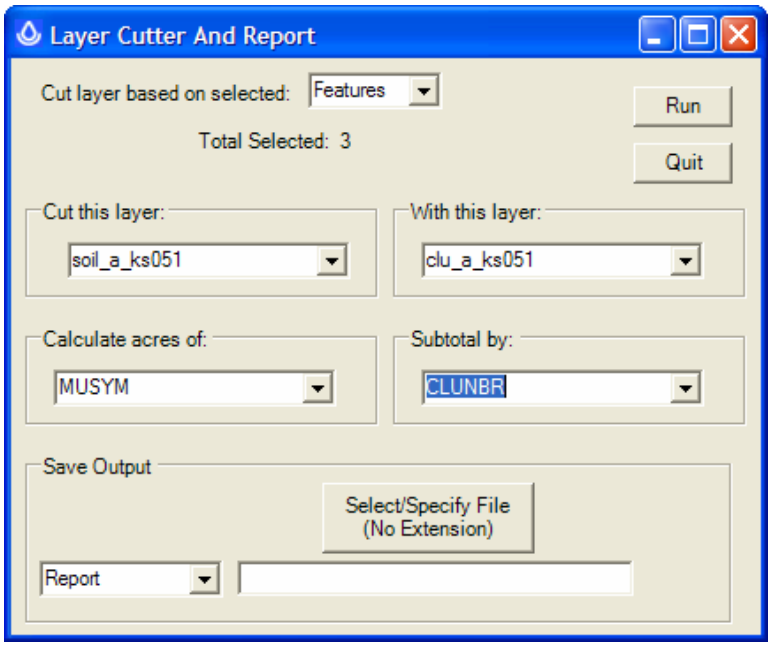
- ❑ Select the *Report* output option. No name is required for the *Report* output option. A report only htm web page will be written to the c:\temp directory.

- ❑ Click *Run*.

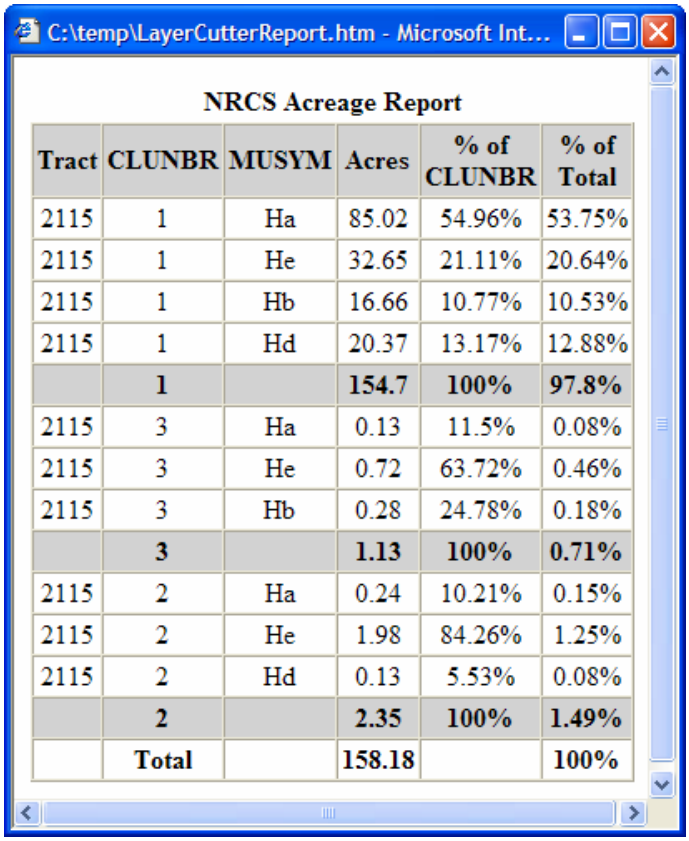
- ❑ A summary acreage report will flash on the screen. Close the window after reviewing.



- A complex report can be created if you select the CLUBR attribute for subtotaling the acres.



Notice the report calculates and subtotals statistics based on the CLU Number (CLUNBR).



C:\temp\LayerCutterReport.htm - Microsoft Int...

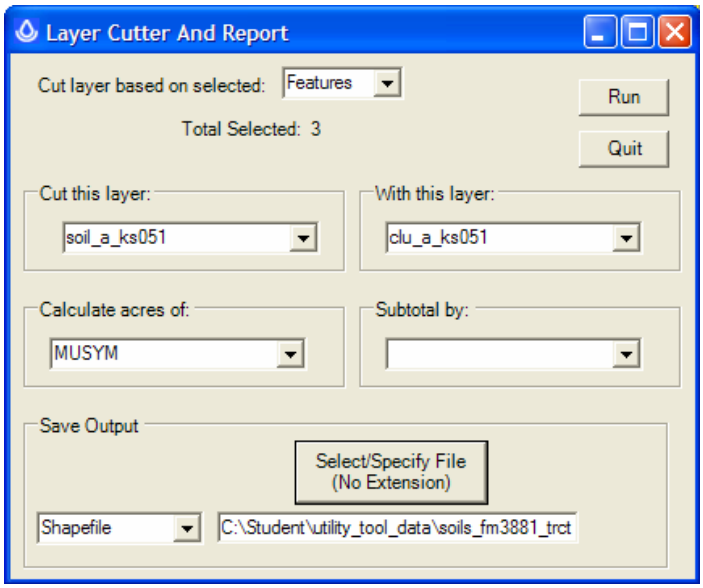
NRCS Acreage Report

Tract	CLUNBR	MUSYM	Acres	% of CLUNBR	% of Total
2115	1	Ha	85.02	54.96%	53.75%
2115	1	He	32.65	21.11%	20.64%
2115	1	Hb	16.66	10.77%	10.53%
2115	1	Hd	20.37	13.17%	12.88%
	1		**154.7**	**100%**	**97.8%**
2115	3	Ha	0.13	11.5%	0.08%
2115	3	He	0.72	63.72%	0.46%
2115	3	Hb	0.28	24.78%	0.18%
	3		**1.13**	**100%**	**0.71%**
2115	2	Ha	0.24	10.21%	0.15%
2115	2	He	1.98	84.26%	1.25%
2115	2	Hd	0.13	5.53%	0.08%
	2		**2.35**	**100%**	**1.49%**
	Total		**158.18**		**100%**

Step 4: Using a Feature to Create a Shapefile and Report

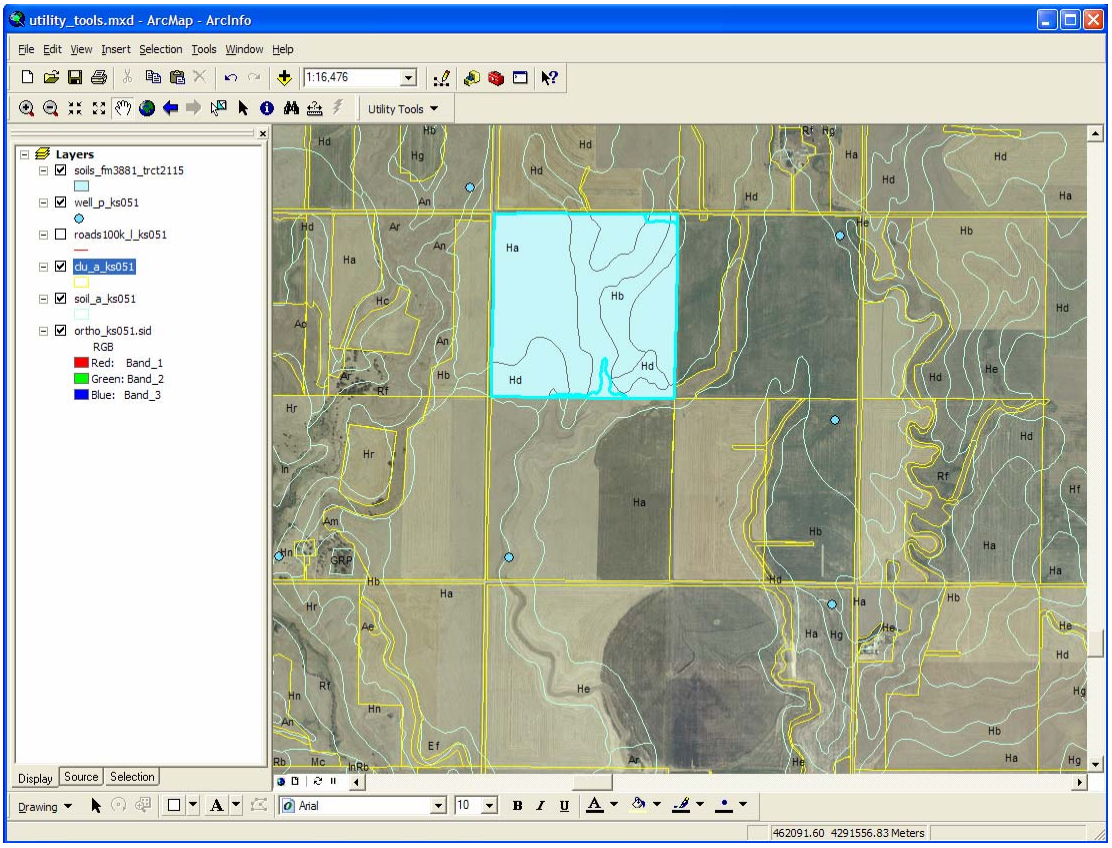
Use Features to base the cut layer and create a new shapefile as well as a report.

- ❑ Selected *Features* are the basis for cutting the *soil_a_ks051* layer.
- ❑ Select the *clu_a_ks051* layer and an attribute for area calculations.
- ❑ Select the *Shapefile* output option.
- ❑ Click on *Select/Specify File (No Extension)* and navigate to the destination directory and provide a shapefile name. Do not provide a file name extension. A shapefile and report file will be written to this directory.



- ❑ Click *Run*.

- A shapefile is automatically added to the table of contents.



Note: The .dbf file with relevant information written to the destination directory can be joined to attribute tables for use in ArcMap.

- Open the attribute table for the new shapefile. The table shows *MUSYM*, *acres*, and *percent* for each polygon.

Attributes of soils_fm3881_trct2115

FID	Shape	MUKEY	MUSYM	acres	percent
0	Polygon	89922	Ha	85.02	53.75
1	Polygon	89926	He	32.65	20.64
2	Polygon	89923	Hb	16.66	10.53
3	Polygon	89925	Hd	15.46	9.78
4	Polygon	89925	Hd	4.91	3.1
5	Polygon	89922	Ha	0.13	0.08
6	Polygon	89926	He	0.72	0.46
7	Polygon	89923	Hb	0.28	0.18
8	Polygon	89922	Ha	0.24	0.15
9	Polygon	89926	He	1.98	1.25
10	Polygon	89925	Hd	0.13	0.08

Record: 1 Show: All Selected Records (0 out of 11 Selected.) Options

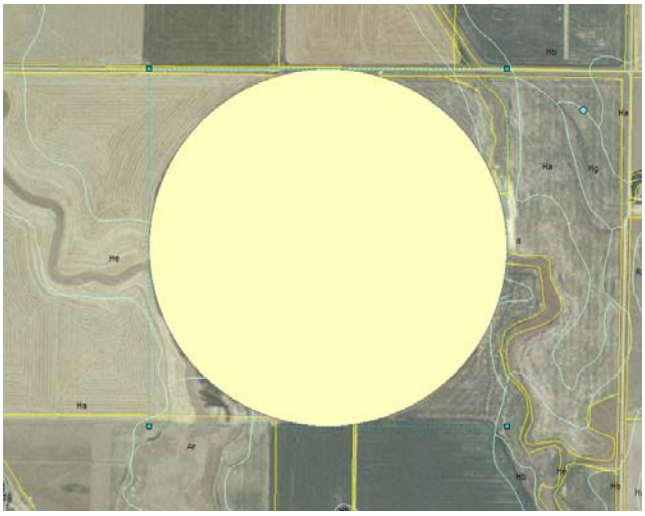
Note: Multiple polygon features can also be used to cut a layer.

- ❑ Clear the selection by clicking on *Selection>Clear Selected Features* from the Main Menu. Click *Quit* to exit the tool

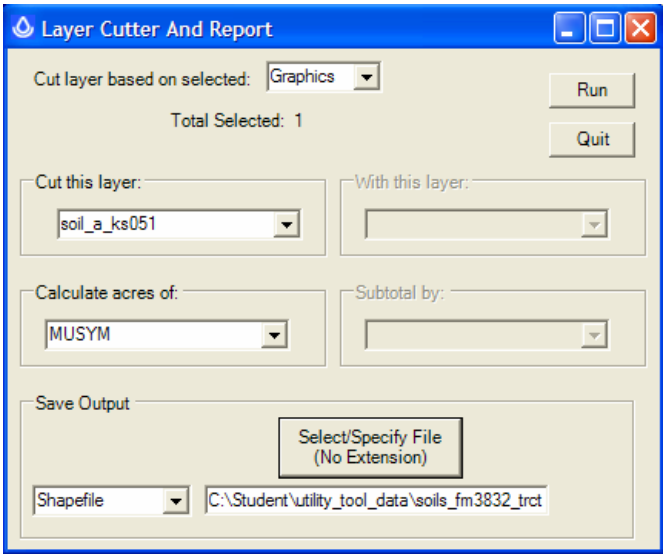
Step 5: Using a Graphic to Create a Shapefile and Report

Use the draw tools to create a graphic for cutting the *soils_a_ks051* layer.

- ❑ Use the New Circle drawing tool and capture the irrigation circle like you did before.



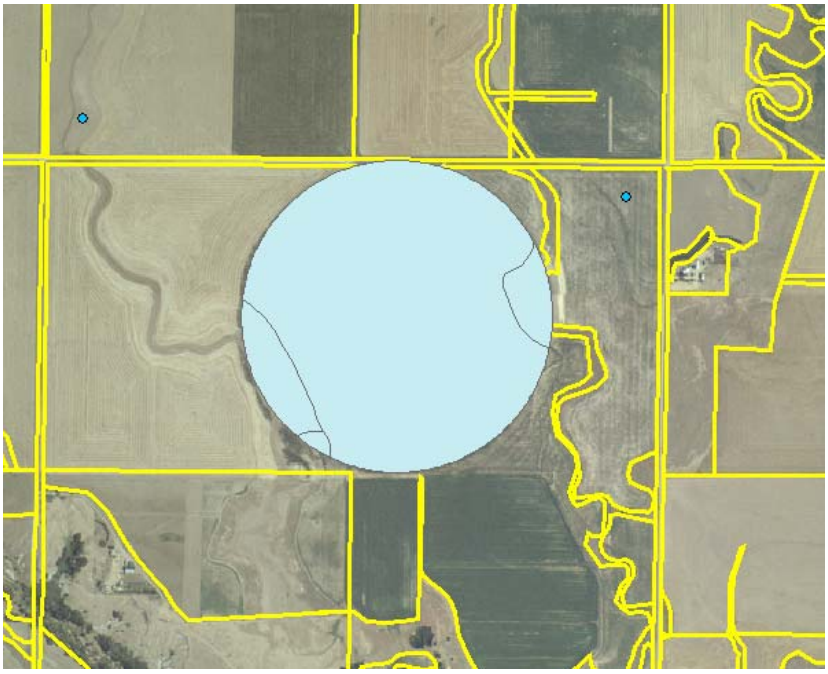
- ❑ Open the *Layer Cutter and Report* tool and complete the dialog boxes as before, but select a graphic as the basis for cutting the *soils_a_ks051* layer. Name the new shapefile *soils_fm3832_trct715.shp*.



- ❑ Click *Run* and inspect the summary report that flashes on the screen. Close the report when finished.

- Click *Quit* to exit the tool.

- Delete the graphic and inspect the new shapefile in ArcMap, including the attribute table.



Attributes of soils_fm3832_trct

FID	Shape	MUKEY	Graphic	MUSYM	acres	percent
0	Polygon	89922	0	Ha	112.78	89
1	Polygon	89926	0	He	7.97	6.29
2	Polygon	89925	0	Hd	5.17	4.08
3	Polygon	89903	0	Ar	0.8	0.63

Record: 1 Show: All Selected Records (0 out of 4 Selected.) Options

- Exit ArcMap.